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## NOTICE OF ALLOWANCE AND FEE(S) DUE

23117 7590 05/27/2009

NIXON & VANDERHYE, PC  
901 NORTH GLEBE ROAD, 11TH FLOOR  
ARLINGTON, VA 22203

EXAMINER

CHOI, LING SIU

ART UNIT

PAPER NUMBER

1796

DATE MAILED: 05/27/2009

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/535,333

08/09/2005

Peter A. Lovell

39-303

5715

TITLE OF INVENTION: RESIN CROSS-LINKING

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	NO	\$1510	\$300	\$0	\$1810	08/27/2009

**THE APPLICATION IDENTIFIED ABOVE HAS BEEN EXAMINED AND IS ALLOWED FOR ISSUANCE AS A PATENT. PROSECUTION ON THE MERITS IS CLOSED. THIS NOTICE OF ALLOWANCE IS NOT A GRANT OF PATENT RIGHTS. THIS APPLICATION IS SUBJECT TO WITHDRAWAL FROM ISSUE AT THE INITIATIVE OF THE OFFICE OR UPON PETITION BY THE APPLICANT. SEE 37 CFR 1.313 AND MPEP 1308.**

**THE ISSUE FEE AND PUBLICATION FEE (IF REQUIRED) MUST BE PAID WITHIN THREE MONTHS FROM THE MAILING DATE OF THIS NOTICE OR THIS APPLICATION SHALL BE REGARDED AS ABANDONED. THIS STATUTORY PERIOD CANNOT BE EXTENDED. SEE 35 U.S.C. 151. THE ISSUE FEE DUE INDICATED ABOVE DOES NOT REFLECT A CREDIT FOR ANY PREVIOUSLY PAID ISSUE FEE IN THIS APPLICATION. IF AN ISSUE FEE HAS PREVIOUSLY BEEN PAID IN THIS APPLICATION (AS SHOWN ABOVE), THE RETURN OF PART B OF THIS FORM WILL BE CONSIDERED A REQUEST TO REAPPLY THE PREVIOUSLY PAID ISSUE FEE TOWARD THE ISSUE FEE NOW DUE.**

### HOW TO REPLY TO THIS NOTICE:

#### I. Review the SMALL ENTITY status shown above.

If the SMALL ENTITY is shown as YES, verify your current SMALL ENTITY status:

A. If the status is the same, pay the TOTAL FEE(S) DUE shown above.

B. If the status above is to be removed, check box 5b on Part B - Fee(s) Transmittal and pay the PUBLICATION FEE (if required) and twice the amount of the ISSUE FEE shown above, or

If the SMALL ENTITY is shown as NO:

A. Pay TOTAL FEE(S) DUE shown above, or

B. If applicant claimed SMALL ENTITY status before, or is now claiming SMALL ENTITY status, check box 5a on Part B - Fee(s) Transmittal and pay the PUBLICATION FEE (if required) and 1/2 the ISSUE FEE shown above.

II. PART B - FEE(S) TRANSMITTAL, or its equivalent, must be completed and returned to the United States Patent and Trademark Office (USPTO) with your ISSUE FEE and PUBLICATION FEE (if required). If you are charging the fee(s) to your deposit account, section "4b" of Part B - Fee(s) Transmittal should be completed and an extra copy of the form should be submitted. If an equivalent of Part B is filed, a request to reapply a previously paid issue fee must be clearly made, and delays in processing may occur due to the difficulty in recognizing the paper as an equivalent of Part B.

III. All communications regarding this application must give the application number. Please direct all communications prior to issuance to Mail Stop ISSUE FEE unless advised to the contrary.

**IMPORTANT REMINDER: Utility patents issuing on applications filed on or after Dec. 12, 1980 may require payment of maintenance fees. It is patentee's responsibility to ensure timely payment of maintenance fees when due.**

# **PART B - FEE(S) TRANSMITTAL**

**Complete and send this form, together with applicable fee(s), to: Mail Mail Stop ISSUE FEE  
Commissioner for Patents  
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INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

23117 7590 05/27/2009

NIXON & VANDERHYE, PC  
901 NORTH GLEBE ROAD, 11TH FLOOR  
ARLINGTON, VA 22203

## **Certificate of Mailing or Transmission**

I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being facsimile transmitted to the USPTO (571) 273-2885, on the date indicated below.

(Depositor's name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/535,333	08/09/2005	Peter A. Lovell	39-303	5715

TITLE OF INVENTION: RESIN CROSS-LINKING

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nonprovisional	NO	\$1510	\$300	\$0	\$1810	08/27/2009

EXAMINER	ART UNIT	CLASS-SUBCLASS
CHOI, LING SIU	1796	524-700000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

- ☐ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.
- ☐ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list

- (1) the names of up to 3 registered patent attorneys or agents OR, alternatively, 1 \_\_\_\_\_
- (2) the name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed. 2 \_\_\_\_\_
- 3 \_\_\_\_\_

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document has been filed for recordation as set forth in 37 CFR 3.11. Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE

(B) RESIDENCE: (CITY and STATE OR COUNTRY)

Please check the appropriate assignee category or categories (will not be printed on the patent) : ☐ Individual ☐ Corporation or other private group entity ☐ Government

4a. The following fee(s) are submitted:

- ☐ Issue Fee
- ☐ Publication Fee (No small entity discount permitted)
- ☐ Advance Order - # of Copies \_\_\_\_\_

4b. Payment of Fee(s); (Please first reapply any previously paid issue fee shown above)

- ☐ A check is enclosed.
- ☐ Payment by credit card. Form PTO-2038 is attached.
- ☐ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment, to Deposit Account Number \_\_\_\_\_ (enclose an extra copy of this form).

5. Change in Entity Status (from status indicated above)

- ☐ a. Applicant claims SMALL ENTITY status. See 37 CFR 1.27. ☐ b. Applicant is no longer claiming SMALL ENTITY status. See 37 CFR 1.27(g)(2).

NOTE: The Issue Fee and Publication Fee (if required) will not be accepted from anyone other than the applicant; a registered attorney or agent; or the assignee or other party in interest as shown by the records of the United States Patent and Trademark Office.

Authorized Signature \_\_\_\_\_

Date \_\_\_\_\_

Typed or printed name \_\_\_\_\_

Registration No. \_\_\_\_\_

This collection of information is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450.

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10/535,333	08/09/2005	Peter A. Lovell	39-303	5715
23117	7590	05/27/2009	EXAMINER	
NIXON & VANDERHYE, PC 901 NORTH GLEBE ROAD, 11TH FLOOR ARLINGTON, VA 22203			CHOI, LING SIU	
			ART UNIT	PAPER NUMBER
			1796	
DATE MAILED: 05/27/2009				

## Determination of Patent Term Adjustment under 35 U.S.C. 154 (b) (application filed on or after May 29, 2000)

The Patent Term Adjustment to date is 624 day(s). If the issue fee is paid on the date that is three months after the mailing date of this notice and the patent issues on the Tuesday before the date that is 28 weeks (six and a half months) after the mailing date of this notice, the Patent Term Adjustment will be 624 day(s).

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Application Information Retrieval (PAIR) WEB site (<http://pair.uspto.gov>).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Customer Service Center of the Office of Patent Publication at 1-(888)-786-0101 or (571)-272-4200.

<b>Notice of Allowability</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	10/535,333	LOVELL ET AL.	
	<b>Examiner</b>	<b>Art Unit</b>	
	Ling-Siu Choi	1796	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--**

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to 02/12/2009.
2. ☒ The allowed claim(s) is/are 1,3-5,11-36 and 39-41.
3. ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
  - a) ☒ All    b) ☐ Some\*    c) ☐ None    of the:
    1. ☐ Certified copies of the priority documents have been received.
    2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
    3. ☒ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

\* Certified copies not received: \_\_\_\_\_.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.

**THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.**

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
5. ☐ CORRECTED DRAWINGS ( as "replacement sheets") must be submitted.
  - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review ( PTO-948) attached
    - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date \_\_\_\_\_.
  - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date \_\_\_\_\_.

**Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).**
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

**Attachment(s)**

- |  |  |
|--|--|
| 1. <input type="checkbox"/> Notice of References Cited (PTO-892)   | 5. <input type="checkbox"/> Notice of Informal Patent Application                      |
| 2. <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                       | 6. <input type="checkbox"/> Interview Summary (PTO-413),<br>Paper No./Mail Date _____. |
| 3. <input type="checkbox"/> Information Disclosure Statements (PTO/SB/08),<br>Paper No./Mail Date _____    | 7. <input checked="" type="checkbox"/> Examiner's Amendment/Comment                    |
| 4. <input type="checkbox"/> Examiner's Comment Regarding Requirement for Deposit<br>of Biological Material | 8. <input checked="" type="checkbox"/> Examiner's Statement of Reasons for Allowance   |
|  | 9. <input type="checkbox"/> Other _____.   |

/Ling-Siu Choi/  
Primary Examiner, Art Unit 1796

### DETAILED ACTION

1. This Office Action is in response to the Amendment filed 02/12/2009. Claims 2, 6-10, and 37-38 were cancelled and claims 40-41 have been added. Claims 1, 3-5, 11-36, and 39-41 are now pending.

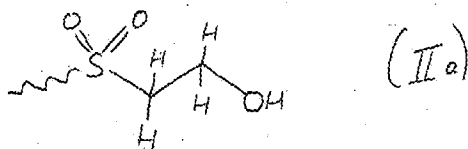
#### *Examiner's Amendment*

2. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CAR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

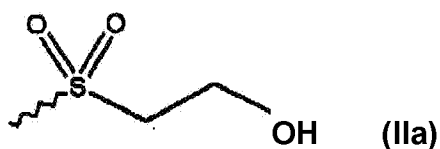
3. The application has been amended as follows:

Claim 35, line 1, "An emulsion" is suggested to be changed to --A latex--;

Claim 40, line 7, change



to



***Allowable Subject Matter***

4. Claims 1, 3-5, 11-36, and 39-41 are allowed.

5. The following is an examiner's statement of reasons for allowance:

The present claims are allowable over the closest references: Tashlick et al. (US 3,153,021) and Hamilton et al. (US 5,514,535).

Summary of Claim 1 [claims 3-4]:

A method of effecting cross-linking of a resin comprising	
	generating vinyl sulfonyl moieties <i>in situ</i> with the resin,
	said vinyl sulfonyl moieties then
	undergoing a reaction which effects <u>cross-linking of the resin</u>
	wherein <u>the vinyl sulfonyl moieties are generated as a result of loss of a</u>
	<u>liquid carrier</u> for the resin to be cross-linked.

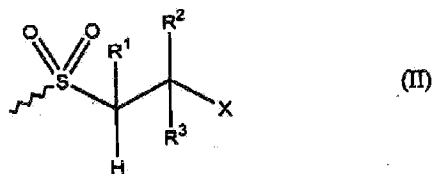
Summary of Claim 5 [claims 11-33]:

A <b>cross-linkable resin</b> composition comprising	
i	a polymer to be cross-linked;
ii	a liquid carrier for the polymer;
iii	nucleophilic groups; and
iv	vinyl sulfonyl precursor groups capable of generating vinyl sulfonyl groups on loss of liquid carrier from the composition
at least one of the groups (iii) and (iv) being attached to the polymer to be cross-linked whereby <u>loss of the liquid carrier</u> results in <u>generation of a vinyl sulfonyl moiety to effect</u>	

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cross-linking of the polymer

wherein the vinyl sulfonyl precursor groups are of the formula (II)



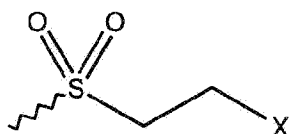
where X is a leaving group, generation of the vinyl sulfonyl moiety results from loss of HX from the vinyl sulfonyl precursor groups, R<sup>1</sup>, R<sup>2</sup> and R<sup>3</sup> are hydrogen atoms, and can be a chemical bond to carbon or heteroatom functionality.

Summary of claim 34 [claims 35-36]:

A **latex** comprising a continuous liquid phase and a discontinuous phase of a film-forming polymer incorporating

(iii) nucleophilic groups; and

(iv) groups of the formula (I)



X = a leaving groups and

= a chemical bond to a carbon or heteroatom,

whereby loss of liquid results in

generation of a vinyl sulfonyl moiety by loss of HX on the groups of formula (I) and

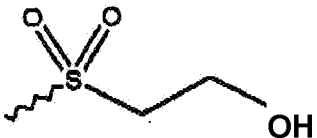
cross-linking of the polymer by reaction of this vinyl sulfonyl and the nucleophilic groups.

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## Summary of Claim 39:

A method of effecting cross-linking of a resin comprising	
	generating vinyl sulfonyl moieties <i>in situ</i> with the resin,
	said vinyl sulfonyl moieties then
	undergoing a reaction which effects <u>cross-linking of the resin</u>
	wherein cross-linking results from reaction of the vinyl sulfonyl moieties with nucleophilic groups in the resin composition.

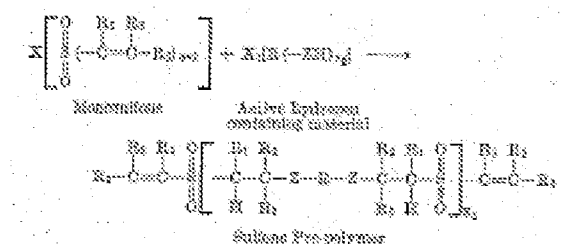
## Summary of Claim 40 [ claim 41]:

A <b>cross-linkable latex resin</b> composition comprising	
	a polymer to be cross-linked in the form of particles in a continuous aqueous phase as liquid carrier for the polymer particles,
	said polymer incorporating nucleophilic groups attached to the polymer chain and further incorporating vinyl sulfonyl precursor groups attached to the polymer chain, said vinyl sulfonyl precursor groups being of the formula (IIa)
	
	wherein <u>loss of carrier water results in generation of vinyl sulfonyl moieties to effect cross-linking of the polymer.</u>

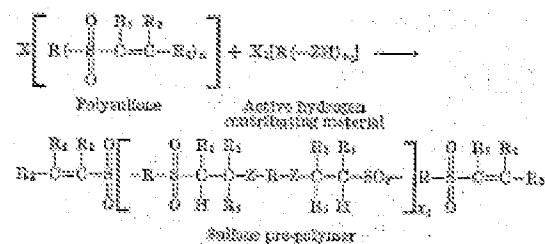
Tashlick et al. disclose a process to crosslink sulfone polymer, the method comprising (A) preparation of a pre-polymer - adding divinyl sulfone into a solution of sodium hydride in 1,4-butanediol at 120°C for 2 hours to obtain a pre-polymer having two vinyl sulfone groups



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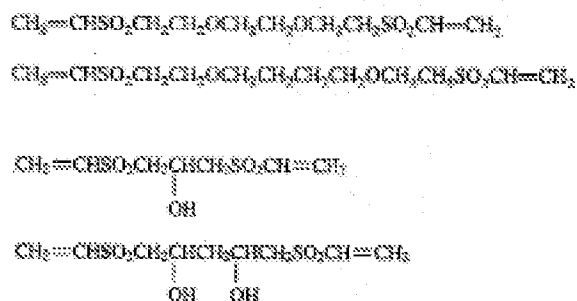
or



and (B) cross-linking - adding ethyl ketone peroxide into a mixture of methyl methacrylate and the pre-polymer to obtain crosslinked polymer (Example 1; col. 7, lines 10-47). However, Tashlick et al. do not teach or fairly suggest **the claimed resin composition or latex**, wherein it comprises, in particular, specific vinyl sulfonyl moieties generated as a result of loss of a liquid carrier for the resin to be cross-linked and effecting cross-linking of the resin or **the claimed method** to effect cross-linking of a resin, comprising generating vinyl sulfonyl moieties *in situ* with the resin as a result of loss of a liquid carrier for the resin to be cross-linked.

Hamilton et al. disclose a composition comprising a hydrophilic colloid, bis(vinylsulfonyl)alkane, and sodium sulfate in water (abstract; claims 2, 16, and 18). Hamilton et al. further disclose that "to be effective in inhibiting homopolymerization of the vinyl sulfone hardener.....the sulfate can be blended with the hydrophilic colloid to be hardened", wherein the hardener includes

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(col. 6, lines 5-59; Examples 1-10). Thus, Hamilton et al. do not teach or fairly suggest **the claimed resin composition or latex**, wherein it comprises, in particular, specific vinyl sulfonyl moieties generated as a result of loss of a liquid carrier for the resin to be cross-linked and effecting cross-linking of the resin or **the claimed method** to effect cross-linking of a resin, comprising generating vinyl sulfonyl moieties *in situ* with the resin as a result of loss of a liquid carrier for the resin to be cross-linked.

In light of the above discussion, it is evident as to why the present claims are patentable over the prior art.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

### **Conclusion**

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6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ling-Siu Choi whose telephone number is 571-272-1098. The examiner can normally be reached on Monday to Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Wu can be reached on 571-272-1114. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

/Ling-Siu Choi/

Primary Examiner, Art Unit 1796

May 25, 2009

Application/Control Number: 10/535,333  
Art Unit: 1796

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